

EPA/OPP MICROBIOLOGY LABORATORY
ESC, Ft. Meade, MD

Standard Operating Procedure
for
Verification of Volume Dispensed and Maintenance of Oxford Automatic
Dispensor and Hamilton Microlab 500

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1.0 SCOPE AND APPLICATION:

- 1.1 This protocol describes the quality control requirements for the Oxford Automatic Dispensor and Hamilton Microlab 500 (see ref. 15.1 and 15.2).

2.0 DEFINITIONS:

- 2.1 Prime = To make an instrument ready for operation by running fluid through the fluid path (tubing, valves and syringes) of an instrument to remove all bubbles and air gaps.

3.0 HEALTH AND SAFETY: Not applicable

4.0 CAUTIONS:

4.1 Oxford Automatic Dispensor

- 4.1.1 The instrument should be primed prior to use and between fluid changes, as explained in the User's Manual (see ref. 15.1). Briefly, before using the instrument and after each use (or when changing media), at least one liter of de-ionized water must be dispensed through the system.

- 4.1.2 Always start dispensing high volumes at low speed.

- 4.1.3 Always check hose connections before operating the machine.

4.2 Hamilton Microlab 500 System

- 4.2.1 Prime the instrument before using for the first time, at the start of a workday and between fluid changes, as explained in sections 3 - 8 of User's Manual (see ref. 15.2). Briefly, the tubing and syringes should be purged and primed by running 1 L of deionized water through them.

- 4.2.2 Clean the instrument periodically by flushing the tubing and syringes with 70% ethanol or with a chlorine bleach and de-ionized water solution (one part household bleach and nine parts de-ionized water). Rinse tubing with de-ionized water. Let

approximately 1 L of de-ionized water run through the tubing.

4.2.3 Do not operate either side dry, as this may cause excessive wear on the syringes and valves.

4.2.4 Avoid using caustic or acidic cleaning solutions.

5.0 INTERFERENCES:

5.1 Oxford Automatic Dispensor

5.1.1 High volumes or viscous fluids dispensed at high speed will result in extremely high discharge velocities and valve pressures that can damage the valve.

5.2 Hamilton Microlab 500 System

5.2.1 Leave the syringes and tubing filled with de-ionized water after use. Buffer or other salt solution residues not removed can crystallize and cause damage to the syringe plunger tip.

5.3 The Hamilton Microlab 500 is more precise than the Oxford Automatic Dispensor. Consequently, the Hamilton Microlab 500 will be used to dispense any media or reagent used as dilution blanks.

6.0 PERSONNEL QUALIFICATIONS:

6.1 Personnel are required to be knowledgeable of the procedures in this SOP.

7.0 SPECIAL APPARATUS AND MATERIALS:

7.1 Oxford Automatic Dispensor

7.1.1 Curtin Matheson, Product No. 8885-047004, Serial Number 5735. Manufacturer claims precision of $\pm 0.5\%$. With polypropylene accessory pack, Catalog No. 387-894, instrument can dispense volumes from 2 mL to 20 mL.

7.1.2 Curtin Matheson, Product No. 8885-047004, Serial Number I0012369. Manufacturer claims precision of $\pm 0.5\%$. With polypropylene accessory pack, Catalog No. 387-894, instrument can dispense volumes from 2 mL to 20 mL.

7.1.3 100 mL volumetric flasks.

7.2 Hamilton Microlab 500 System

7.2.1 Microlab 540 B, Serial No. MD92JMO868, Catalog No. 35892: The instrument can dispense volumes from 2.5 mL to 50 mL.

7.2.2 Controller Unit and cord, Catalog No. 35893

7.2.3 Dual hand probe, Catalog No. 35767

7.2.4 Syringes: Size 25 mL, Model No. 1025 TLL, Catalog No. 82521

7.2.5 Two 50 mL Volumetric flasks

8.0 INSTRUMENT OR METHOD CALIBRATION: Not applicable

9.0 SAMPLE HANDLING AND STORAGE: Not applicable

10.0 PROCEDURE AND ANALYSIS:

10.1 Oxford Automatic Dispensor

10.1.1 The instrument is set to deliver 10.3 mL quantities of liquid. However, in the event that the instrument is set to deliver other than 10.3 mL, the verification of volume would be performed on the specific target volume prior to use. The instrument is set to deliver 10.3 mL in order to account for any volume lost after sterilization.

10.1.2 On a weekly basis prior to use, ten 10.3 mL quantities of de-ionized water are dispensed into a 100 mL volumetric flask. The instrument will be calibrated at a certain speed. Speed can be adjusted using the speed control knob. The knob

should be between the 6-7 settings. If the amount of liquid dispensed is above the volume mark, mathematically add the amount of liquid removed to adjust the fluid level in the flask to the volume mark to 100 mL to determine the amount actually dispensed (for example 3.5 mL + 100 mL). If the amount of liquid dispensed is below the volume mark, mathematically subtract the amount of liquid added to adjust the fluid level in the flask to the volume mark from 100 mL to determine the amount actually dispensed (for example 100 mL - 1.1 mL). The liquid is added or removed using a 5 mL serological pipette. The percent error must be less than $\pm 5\%$ or the machine must be re-calibrated as specified in the manufacturer's instructions (see ref. 15.1).

- 10.1.3 The instrument is cleaned periodically by disassembly of the dispensing parts and soaking them in Alconox detergent. The parts are subsequently rinsed thoroughly with tap water and then in deionized water prior to reassembly.

10.2 Hamilton Microlab 500 System

- 10.2.1 Currently the instrument has been programmed to deliver 9.4 mL of liquid from each probe of the dual hand probe (see section 7.2.3). However, in the event that the unit is set to deliver a volume other than 9.4 mL, the verification of volume must be performed on the specific target volume prior to use. The instrument is set to deliver 9.4 mL in order to account for any volume lost after sterilization.
- 10.2.2 The volume dispensed is verified quarterly.
- 10.2.3 To verify volume, dispense ten 9.4 mL aliquots of de-ionized water into 2 tubes (five 9.4 mL aliquots from each probe of the dual hand probe). Pour contents into two 50 mL volumetric flasks to measure the quantities. If the amount of liquid dispensed is above the volume mark(s), mathematically add the amount of liquid removed to adjust the fluid level in the flask to the volume mark to 50 mL to determine the amount actually dispensed (for example 1.2 mL + 50 mL). If the amount of liquid dispensed is below

the volume mark(s), mathematically subtract the amount of liquid added to adjust the fluid level in the flask to the volume mark from 50 mL to determine the amount actually dispensed (for example 50 mL - 3.1 mL). The liquid is added or removed using a 5 mL serological pipette. The percent error must be less than $\pm 5\%$ or the machine must be reprogrammed.

11.0 DATA ANALYSIS/CALCULATIONS:

11.1 Oxford Automatic Dispensor

- 11.1.1 Calculate percent error for the amount of liquid dispensed. The percent error is determined using the formula:

$$\text{Percent Error} = \frac{(103 - \text{amount of liquid actually dispensed})}{103} \times 100$$

11.2 Hamilton Microlab 500 System

- 11.2.1 Calculate percent error for the amount of liquid dispensed. The percent error is determined using the formula:

$$\text{Percent Error} = \frac{(47 - \text{amount of liquid actually dispensed})}{47} \times 100$$

12.0 DATA MANAGEMENT/RECORDS MANAGEMENT:

- 12.1 The data will be recorded promptly, legibly and in indelible ink on the appropriate forms namely Oxford Automatic Dispensor Maintenance Record Form or Hamilton Microlab 500 Record Form. Completed forms are archived in notebooks kept in locked files in the File Room D217. Only authorized personnel have access to the locked files. Archived data is subject to OPP's official retention schedule contained in SOP ADM-03,

Records and Archives.

13.0 QUALITY CONTROL:

- 13.1 The OPP Microbiology Laboratory conforms to 40 CFR Part 160, Good Laboratory Practices. Appropriate quality control measures are integrated into each SOP.
- 13.2 For quality control purposes, calibration check information is documented on the appropriate record form (see 16.1).

14.0 NONCONFORMANCE AND CORRECTIVE ACTION:

- 14.1 Any deviation in the protocol is documented and kept in laboratory records. The instruments are re-calibrated as indicated in the manufacturers' instruction manuals, if the percent error is >5% (see ref. 15.1 and 15.2).

15.0 REFERENCES:

- 15.1 Oxford Automatic Dispensor Instructions.
- 15.2 User's Manual: Hamilton Microlab 500.

16.0 FORMS AND DATA SHEETS:

- 16.1 Oxford Automatic Dispensor Record Form.
- 16.2 Hamilton Microlab 500 Record Form.

Verification of Volume of Oxford Automatic Dispenser Record

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Verification of Volume of Hamilton Microlab 500 Record

OPP Microbiology Laboratory

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